REMARKS

In view of the following discussion and claim amendments, the Applicants submit that none of the claims now pending in the application are anticipated or obvious under the provisions of 35 U.S.C. § 102 and § 103. Claim 2 is canceled without prejudice. Thus, the Applicants believe that all of these claims are now in allowable form.

I. REJECTION OF CLAIMS 1, 3-4, 6, 8-9 UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1, 3-4, 6 and 8-9 in the Office Action under 35 U.S.C. § 102 as being anticipated by Jacobson, et al. (U.S. Patent Publication 2004/0033679, published February 19, 2004, hereinafter referred to as "Jacobson"). The Applicants respectfully traverse the rejection.

Jacobson teaches a patterning of nanostructures. In one embodiment, Jacobson teaches using a scanning beam to crack hydrocarbon vapors and then charge the hydrocarbon vapors, thereby attracting charged nanoclusters. (See Jacobson, para. [0073].) In another embodiment, Jacobson teaches using an ion beam to charge nanoclusters. (See Jacobson, para. [0074]-[0075].)

The Examiner's attention is directed to the fact that Jacobson fails to teach or to suggest the novel concept of a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means and selectively heating at least one reactant on the local region using the heat emitting surface of the heating means, as positively claimed by Applicants' amended independent claim 1. Specifically, Applicants' amended independent claim 1 recites:

> 1. A method for chemically fabricating or altering a submicrostructure on an object, comprising:
>
> providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means;
>
> providing at least one reactant on the local region of the object; and
>
> selectively heating the at least one reactant on the local region using the heat emitting surface of the heating means to facilitate in the

> local region a local chemical reaction for forming or altering a submicrostructure on the local region. (Emphasis Added.)

The Applicants' invention teaches a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means and selectively heating at least one reactant on the local region using the heat emitting surface of the heating means. In an exemplary embodiment reactants at ambient temperature are supplied to a local region of the object. (See Applicants' specification, para. [0021]. A heating means is provided with a small heat emitting surface that locally increases the temperature of the at least one reactant disposed proximate to the small heat emitting surface of the heating means. (See Applicants' specification, para. [0017]; para. [0025].) The high temperature of the at least one reactant facilitates a local chemical reaction between the at least one reactant that forms the desired microstructure. (See *Id.*)

In contrast, Jacobson fails to teach or to suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means and selectively heating at least one reactant on the local region using the heat emitting surface of the heating means. Jacobson only teaches using beams of energy such as a scanning beam or ion beam to charge hydrocarbons and nanoparticles. (See Jacobson, para. [0073]-[0075].)

The Examiner refers the Applicants to FIGs. 6-8 and 16, alleging that Jacobson anticipates the Applicants' invention based on these figures. However, the Applicants respectfully submit that the Jacobson's specification does not support the Examiner's interpretation of these figures. The Examiner alleges that FIGs. 6-8 teach to use a beam of energy to heat the substrate. (See Final Office Action, p. 8, ll. 18-20.)

Regarding FIG. 6, contrary to the Examiner's interpretation, Jacobson specifically teaches that the scanning beam 620 is used to crack the hydrocarbon

vapors 630. (See Jacobson, para. [0073].) The hydrocarbon vapors 660 are then charged by scanning beam 620. (See *Id.*) Finally, the substrate 610 is dusted with nanoclusters 140 having a polarity opposite to that of hydrocarbon vapor patter 660 and deposit thereon to form features 670. (See *Id.*) Clearly Jacobson at best teaches that the hydrocarbon vapors 660 are charged by scanning beam 620. Applicants respectfully submit that charging a particle is not the same as selectively heating at least one reactant on the local region using the heat emitting surface of the heating means.

Regarding FIG. 7, Jacobson teaches that the electron beam 710 scans a pattern and directly interacts with nanoclusters 140 (i.e. not the substrate). (See Jacobson, para. [0074], emphasis added.) This interaction may be caused by a direct collision between the energy beam and a portion of the building blocks, i.e., between electrons from electron beam 710 and nanoclusters 140. (See *Id*, emphasis added.) Consequently, FIG. 7 fails to teach or to suggest the limitation of selectively heating at least one reactant on the local region using the heat emitting surface of the heating means. Rather, the features on the substrate are formed indirectly by the kinetic interaction between electron beam 710 (i.e. the alleged heating means) and nanoclusters 140.

Similarly regarding FIG. 8, Jacobson teaches that the interaction between ion beam 810 and nanoclusters 140 may result in a change of at least one physical property of at least a portion of nanoclusters 140. (See Jacobson, para. [0075], emphasis added.) The sintered nanoclusters 140 may build a feature 830 on substrate 830. (See *Id.*) Again, FIG. 8 fails to teach or to suggest the limitation of selectively heating at least one reactant on the local region using the heat emitting surface of the heating means. Rather, the features on the substrate are formed by indirectly by the ion beam 810 (i.e. the alleged heating means).

Finally, regarding FIG. 16, Jacobson again fails to support the Examiner's assertion. In fact, Jacobson teaches in direct contradiction to the Examiner's assertion that Jacobson teaches a beam of energy to heat the substrate. Jacobson clearly teaches that the electron beams are used for a physical

transformation. (See Jacobson, para. [0092], "[w]hen electron beam 1605 [emitted from SEM 1610] collides with a surface 1626 of feature 1622, secondary electron 1635 and x-rays 1635 are emitted," emphasis added.) Again, FIG. 16 fails to teach or to suggest the limitation of selectively heating at least one reactant on the local region using the heat emitting surface of the heating means.

Finally, even if the Examiner maintains his unduly broad interpretation of Jacobson, Jacobson still fails to teach or to suggest wherein said heating means includes a heat emitting surface embedded in said heating means. The Applicants respectfully submit that a SEM or ion beam do have a physical heat emitting surface embedded in said heating means. Rather, they shoot an electron beam or ion beam. Therefore, Jacobson clearly fails to anticipate Applicants' independent claim 1.

Furthermore, dependent claims 3-4, 6 and 8-9 depend, either directly or indirectly, from claim 1 and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 3-4, 6 and 8-9 are also patentable and not anticipated by Jacobson. As such, the Applicants respectfully request the rejection be withdrawn.

II. REJECTION OF CLAIMS 1 AND 4-17 UNDER 35 U.S.C. § 103

A. Claims 1, 4, 6, 8-9 and 12-15

The Examiner has rejected claims 1, 4, 6, 8-9 and 12-15 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Yu (U.S. Patent No. 6,291,302, issued September 18, 2001, hereinafter referred to as "Yu") in view of Albrecht, et al. (U.S. Patent No. 5,537,372, issued July 16, 1996, hereinafter referred to as "Albrecht"). The Applicants respectfully traverse the rejection.

Yu teaches a selective laser anneal process using a highly reflective aluminum mask. A laser is used to activate dopants in an active region of a field effect transistor. (See Yu, Abstract.)

Albrecht teaches a high density data storage system with topographic contact sensor. The storage system further includes a high resolution contact sensor having a cantilever arm and a stylus mounted at one end of the cantilever

arm. (See Albrecht, Abstract.)

The Applicants respectfully submit that the combination of Yu and Albrecht, alone or in any permissible combination fail to teach, show or suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means, as positively claimed by Applicants' amended independent claim 1. (See *supra*.)

Yu only teaches laser annealing a substrate to activate an implanted dopant. (See Yu, col. 5, ll. 6-23.) Yu fails to teach, show or suggest providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means. The Examiner concedes this in the Final Office Action. (See Final Office Action, p. 4, ll. 8-9.) However, the Examiner alleges that Albrecht bridges the substantial gap left by Yu.

The Applicants respectfully submit that Albrecht fails to bridge the substantial gap left by Yu. Albrecht only teaches that a stylus is heated by focusing a laser beam, via a lens, generated by a diode laser. (See Albrecht, col. 7, ll. 51-59.) Therefore, the combination of Yu and Albrecht, fail to teach or to suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means. Therefore, the combination of Yu and Albrecht, alone or in any permissible combination, fails to render obvious Applicants' independent claim 1.

Furthermore, dependent claims 4, 6, 8-9 and 12-15 depend, either directly or indirectly, from claim 1 and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 4, 6, 8-9 and 12-15 are also patentable and not made obvious by the teachings of Yu and Albrecht. As such, the Applicants respectfully request the rejection be withdrawn.

B. Claims 5, 7, and 16

The Examiner has rejected claims 5, 7 and 16 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Jacobson in view of Albrecht. The Applicants respectfully traverse the rejection.

The teachings of Jacobson and Albrecht are discussed above. As discussed above, Jacobson fails to teach or to suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means, as positively claimed by Applicants' amended independent claim 1. (See *supra*.)

Albrecht fails to bridge the substantial gap left by Jacobson because Albrecht only teaches that a stylus is heated by focusing a laser beam, via a lens, generated by a diode laser. (See Albrecht, col. 7, ll. 51-59.) Therefore, the combination of Jacobson and Albrecht, fail to teach or to suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means. Therefore, the combination of Jacobson and Albrecht, alone or in any permissible combination, fails to render obvious Applicants' independent claim 1.

Furthermore, dependent claims 5, 7 and 16 depend, either directly or indirectly, from claim 1 and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 5, 7 and 16 are also patentable and not made obvious by the teachings of Jacobson and Albrecht. As such, the Applicants respectfully request the rejection be withdrawn.

C. Claims 5 and 10-11

The Examiner has rejected claims 5, and 10-11 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Jacobson in view of Binning, et al. (U.S. Patent No. 6,218,086, issued April 17, 2001, hereinafter referred to as

"Binning".) The Applicants respectfully traverse the rejection.

The teachings of Jacobson are discussed above. Binning teaches a method of forming ultrasmall structures and apparatus therefore. A tip which is movable relative to the surface of a thin film is used for forming ultrasmall structures in the thin film. The penetration depth of the tip is limited thereby avoiding wear of the tip. (See Binning, Abstract.)

As discussed above, Jacobson fails to teach or to suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means, as positively claimed by Applicants' amended independent claim 1. (See *supra*.)

Moreover, Jacobson and Binning cannot be meaningfully combined. Jacobson creates nanostructures by electrically charging a pattern on the substrate and then dusting the substrate with nanoclusters having a polarity opposite to that of the hydrocarbon vapor pattern on the substrate. (See Jacobson, para. [0073].) In contrast, Binning forms features in a thin film using a movable tip. Moreover, there is no motivation or suggestion in Jacobson or Binning to combine the two references. Therefore, the combination of Jacobson and Binning, alone or in any permissible combination, fails to render obvious Applicants' independent claim 1.

Furthermore, dependent claims 5 and 10-11 depend, either directly or indirectly, from claim 1 and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 5 and 10-11 are also patentable and not made obvious by the teachings of Jacobson and Binning. As such, the Applicants respectfully request the rejection be withdrawn.

D. Claim 17

The Examiner has rejected claim 17 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Jacobson in view of Albrecht and in further view of Field (U.S. Publication No. 2003/0222965, published on December 4, 2003,

hereinafter referred to as "Field"). The Applicants respectfully traverse the rejection.

The teachings of Jacobson and Albrecht are discussed above. Field teaches a method and materials for entitling compact discs. A curable material is provided on a data surface of the optical recording medium and a laser is used to interact with the curable material to form permanent text and/or images on the optical recording medium. (See Field, para. [0022]).

As discussed above, Jacobson and Albrecht fails to teach or to suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means, as positively claimed by Applicants' amended independent claim 1. (See *supra*.)

Field fails to bridge the substantial gap left by Jacobson and Albrecht because Field only teaches using a beam of energy such as a laser or some other source of narrowly-focused beam of energy. (See Field, para. [0022].) Therefore, the combination of Jacobson, Albrecht and Field, fails to teach or to suggest a method for chemically fabricating or altering a submicrostructure on an object comprising providing a heating means proximate to a local region of the object, wherein said heating means includes a heat emitting surface embedded in said heating means. Therefore, the combination of Jacobson, Albrecht and Field, alone or in any permissible combination, fails to render obvious Applicants' independent claim 1.

Furthermore, dependent claim 17 depends indirectly from claim 1 and recites additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claim 17 is also patentable and not made obvious by the teachings of Jacobson, Albrecht and Field. As such, the Applicants respectfully request the rejection be withdrawn.

CONCLUSION

Thus, the Applicants submit that all of these claims now fully satisfy the

requirement of 35 U.S.C. §102 and §103. Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully Submitted,

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